Pisum (white variegation, SPRENGER, 1916)
Campanula (PELLEW, 1917)
Urtica (CORRENS, 1919)
Mesembryanthemum (CORRENS, 1919)
Arabis (CORRENS, 1919)
Aubretia (CORRENS, 1919)
Oenothera (STOMPS, 1920)
Mercurialis (CORRENS, 1920)
Beta (STEHLÍK, 1921; MUNERATI, 1928)
Hordeum (SÔ, 1921)
Stellaria (CORRENS, 1922)
Senecio (CORRENS, 1922)
Taraxacum (CORRENS, 1922)
Hieracium (CORRENS, 1922)
Chlorophytum (COLLINS, 1922)
Zea Mays (ANDERSON, 1923)
Mimulus (BROŽEK, 1923)
Hydrangia (CHITTENDEN, 1926)
Nicotiana (HONING, 1927)
Oryza (KONDÔ, TAKEDA, FUJIMOTO, 1927; TAKEZAKI, 1922)
Primula veris (CHATTAWAY and SNOW, 1929)
Viola (CLAUSEN, 1929, intermediate type for II-*A*-*a*)
Hosta (YASUI, 1929)
Pisum (yellow variegation, DE HAAN, 1931)

II-*B*-*b* (maternal inheritance, constant *albomaculata*)
Humulus (WINGE, 1917, 1919)
Pisum (yellow variegation, KAJANUS, 1924)?

SUMMARY

Two hitherto unknown flower colours of *Pisum*, called apple and pinkish white, have been described and their heredity studied. Both differ from purple in 1 factor; these factors which are dominant in purple have been called A_p and A_m. Apple and pinkish white have been considered factor mutants. Crossing with apple resulted in 2 new flower colours: apple violet and apple rose, both differing from purple in 2 factors.

The relation between flower colour and leaf axil colour has been

more fully discussed. The factor A_p does not affect the leaf axil, only the flower, whereas the factor A_m affects flower and leaf axil in a different way.

A connection has been established between the colour factors and the leaf colour in spring.

In a large culture of purple-flowering peas a purple patched form occurred. Purple patched consists of a mosaic of white and purple parts. Besides the other factors for purple the white parts have instead of A a factor A_2 arisen from it through mutation. The purple parts, however, do possess the factor A, A_2 being a labile factor, which can pass into A. Besides purple parts also purple dotted parts arise on the purple patched plant.

Purple patched is not constant; in the progeny there occur besides purple patched also purple, purple dotted and 'white', that is extremely faint purple patched.

The crosses of purple patched $\times$ white are reciprocally different. When purple patched is used as mother there also occur besides purple patched, purple and purple dotted F_1 plants; when on the other hand, purple patched is used as father, all F_1 plants are either purple or purple dotted, but never purple patched. In order to explain the genetic behaviour a working-hypothesis has been set up, based on the assumption that patching is due to the mutation $A_2 \rightarrow A$ in cells with labile plasm. If the labile plasm passes into normal plasm no mutation takes place and purple dotted arises. There is a fundamental difference between purple patched and purple dotted; the former is a mosaic of genetically different parts, the latter is a pattern of which the coloured and the colourless cells have the same hereditary constitution.

In the cultures a new form, crypto purple occurred, for which the factor A_1 has been established. The factors for purple, crypto purple, purple dotted and white form part of a series of multiple allelomorphs $A - A_1 - A_2 - a$.

The interaction of the two growth-inhibiting factors *La* and *Lb* and the growth-favouring factor *Le* has been investigated and the F_2 data have been confirmed by an extensive F_3.

A new case of two polymeric factors, called *Lc* and *Ld* has been determined; these factors also have a growth-inhibiting effect.

From the research into the genetic relation of the crypto dwarfs

and the slender peas it has been concluded, that *La* is identical with 1 of the crypto dwarf factors.

An investigation has been made into the distribution of the factors *la* and *lb*. In the forms examined the *la* factor is very rare, while *lb* is demonstrated in various forms. Afterwards it appeared that forms possessing *lb* are related. From this follows the value of the factors *la* and *lb* for determining relationship in cases in which nothing is known about the descent. For the very reason that the hereditary constitution cannot be determined from the phenotype, the descent will be traceable with the aid of genetic analysis. This same holds good for the factors *lc* and *ld*.

The *lb* factor is absolutely linked with 1 of the factors for wax.

With respect to the slender pea it appears that without fertilization parthenocarpism can occur.

On one short plant a yellow variegated branch appeared. From its progeny it was inferred that yellow variegation corresponds with the status *albomaculatus* as known in other plants. The reciprocal crosses with normal green were different. Yellow variegation is not transmitted by the father. To explain the hereditary behaviour it has been adopted that the plasm of the variegated plant is in a labile state and that the green patches are due to the transition from the state of labile to that of normal plasm.